Taylor Larrechea P: 38,39,63

Dr. Middleton PHYS 132 HW

3-30-17 Ch.32

Problems

32.P.38 $\tau = uB\sin\alpha$

$$u = \frac{\tau}{B\sin\alpha} = 0.28\ Am^2$$

$\vec{u} = 0.28\ Am^2$

$\tau = 0.020\ Nm$

$B = 0.10\ T$

$\alpha = 45^0$

32.P.39

a.) τ? $\tau = \vec{\mu} \times \vec{B}$

$\tau = \mu B \sin\theta$

$\mu = AI$

$= (\pi(1.0\times10^{-3}m)^2)(2.0\,A)$

$\mu = 6.28\times10^{-6}$

$B_{wire} = \frac{\mu_0 I}{2\pi d}$ $\quad \mu_0 = 4\pi\times10^{-7}$ $\quad d = 2.0\times10^{-2}m$ $\quad I = 2.0\,A$

$\vec{B} = 2.0\times10^{-5}\,T$

$\tau = (6.28\times10^{-6}\,Am^2)(2.0\times10^{-5}\,T)$

$\tau = 1.256\times10^{-10}\,Nm$

$\tau = 1.256\times10^{-10}\,Nm$
Rotates $\pm 90^\circ$

b.) The loop would have no ~~effect~~ if it were rotated $\pm 90^\circ$

32.P.63 $F = qE$, $F = q\vec{v} \times \vec{B}$, $F = ma$

$F_{net} = \vec{F_E} + \vec{F_B}$

$a = 2.4 \times 10^{10} m/s^2$

$F_E = qE$

$= -1.602 \times 10^{-19} C (1000 V/m)$

$F_E = -1.602 \times 10^{-19} N$

$F_B = q\vec{v} \times \vec{B}$

$\vec{v} = \langle -500 m/s, 0, 0 \rangle$

$\vec{B} = \langle 0, 0, -2.5T \rangle$

$q = -1.602 \times 10^{-19} C$

$F_B = 2.002 \times 10^{-16} N$

$F_{net} = 4.005 \times 10^{-17} N$

$F = ma$

$a = \frac{F}{m}$ $F = 4.0 \times 10^{-17} N$

$m = 1.67 \times 10^{-27} kg$

$a = 2.4 \times 10^{10} m/s^2$